Astronomy

4-3 The student will demonstrate an understanding of the properties, movements, and locations of objects in the solar system. (Earth Science)

4.3.7 Interpret the change in the length of shadows during the day in relation to the position of the Sun in the sky.

Taxonomy level: 2.1-B Understand Conceptual Knowledge

Previous/Future knowledge: This indicator is new material for this grade and is the only grade where this concept is developed. A connection can be made with the behavior of light as it strikes an object in the Properties of Light topic (4-5). In 8th grade (8-4), shadows are studied in the eclipses of the Sun and the Moon.

It is essential for students to know that objects on Earth cast shadows that help show Earth's rotation. The angle of the Sun, low in the sky to higher in the sky, changes the length of the shadow cast behind an object.

- In the morning, the Sun appears low in the sky; objects cast long shadows.
- As Earth rotates, the Sun's appears higher in the sky, and the shadows get shorter.
- At noon, with the Sun overhead, objects cast short shadows or no shadow at all.
- As Earth continues to rotate and the Sun appears lower in the sky toward evening, the shadows get longer again.

It is not essential for students to know about the types of shadows cast, umbra, or penumbra. Students do not need to make or interpret sundials.

Assessment Guidelines:
The objective of this indicator is to *interpret* the change in the length of shadows during the day in relation to the position of the Sun in the sky; therefore, the primary focus of assessment should be to change one form of presentation, like a description or drawing, into another that shows this relationship. However, appropriate assessments should also require students to *predict* a time of day based on the amount of shade; or *recognize/recall* the reason that shadows change shape or the reason the Sun is in different positions in the sky.